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Factors that influence mammography screening behaviour: A qualitative study of Greek women's experiences.

ABSTRACT

Aim: To identify the factors that influence mammography screening behaviour in a sample of Greek women.

Methods/Sample: Data were collected in Athens-Greece, from individuals who were members of six women's associations. A subset of 33 women were interviewed about their screening behaviour and experiences out of the 186 women who completed an initial questionnaire. This paper focuses on the findings revealed from the interviews. Women's associations were approached for the recruitment of the interviewees.

Results: Influences arising from women's immediate networks, such as family and close friends, appeared to be of essential importance in relation to their screening behaviour, while influences from their broader networks were of moderate impact. Fear acted as a motivator but also as a barrier in relation to mammography screening participation. Experiences that arose from engagement with the mammography screening processes were mostly characterized by having to overcome a variety of obstacles, such as long bureaucratic procedures and distrust in doctors.

Conclusions: The interpersonal relationships between women and their social networks appeared to have an important and influential role in relation to breast screening behaviour. The quality of these relationships appeared to determine women's participation in mammography screening. It would appear that future practice needs to focus on these relationships in order to utilize them in a positive way. Future research is needed to explore this further.

Key words: Breast screening, early detection, influential factors, mammography screening, screening behaviour.

Background

Breast cancer is the third largest cause of cancer deaths in Europe (Ferlay et al. 2007). It accounts for 29% of all cancer incidences (Linos 2005; Ioannidou-Mousaka 2006).

Early detection of breast cancer can decrease mortality rates. Indeed mortality resulting from breast cancer has decreased by an average of 1.7% per year in the European Union during the period 1995 to 2000, mainly due to early diagnosis and effective treatment (Levi et al. 2007). However, despite the general decrease of mortality rates in most of Europe, mortality rates due to breast cancer are still high in Greece (Mauri et al. 2009). The falls in breast cancer mortality rates in Greece, Portugal and France are smaller compared to those in the rest of Europe throughout the last decade (Levi et al. 2005). Greece and Portugal are at the top of the list of breast cancer incidences (Boyle et al. 2003), while in Greece between 1,500 and 1,800 women die from breast cancer every year out of the 4,000 who develop the disease (Ioannidou-Mousaka 2005). This could be due to breast cancer detection at an advanced stage resulting from the low participation of Greek women in mammography screening test (Keramopoulos et al. 2005).

Preventive healthcare tests including mammograms are offered by the Greek health care system to the population on an opportunistic basis. This means that participation in mammograms, often after a Clinical Breast Examination (CBE), depends on advice from primary care providers and on individuals' requests for screening, since a centralised invitational register is lacking (Kamposioras et al. 2008). Women use either the National Sector, where they pay a minimum fee, or the Private Sector, where they pay the full cost of screening. There are no National guidelines on the age mammograms should start on a regular basis. Women are, however, being informed by media and health care providers on this issue, influenced by worldwide guidelines. For example, according to the American Cancer Society, recommendations call for yearly mammography screening beginning at age 40 for women at average risk of breast cancer (Smith et al. 2004).

Role of screening

The role of mammography screening is to detect tumours before they are clinically palpable, minimising the probability of diagnosing breast cancer at an advanced stage (Kimberly et al. 2003). For women with an average risk, mammography screening constitutes one of the most effective ways to detect cancer (McCaul et al. 1999; Hoffken 2001; Kimberly et al. 2003), and official global recommendations support its use. Even though the benefits of mammograms and particularly the mammography's efficacy related to reduction of mortality rates have been questioned by several researchers (Gotzsche et al. 2000; Gotzsche 2004; Gotzsche et al. 2009; Jorgensen et al. 2009; Autier et al. 2010; Jorgensen et al. 2010), this has provoked adverse criticism from many who believe that screening saves lives (Dilhuydy et al. 1997; Thornton 2001). Many others maintain that mammography screening reduces breast cancer mortality in women aged 50 to 74 years by approximately 26% (McCaul et al. 1999; Hoffken 2001; Heath 2009; Savage 2009). Nevertheless, each woman should be able to make her own decision regarding the utilisation of mammography screening; this presupposes them to be well-informed about the benefits, possible harms and efficacy of this test (Chamot et al. 2001; Gotzsche 2004; Heath 2009; Jorgensen et al. 2009; Welch 2010). It is argued that a balanced and easily understandable way of providing such information is needed throughout invitation letters for mammograms (Jorgensen et al. 2006).

Within Greece, evidence has identified low participation rates in the participation in mammography screening (Kamposioras et al. 2008; Dimitrakaki et al. 2009; Mauri et al. 2009). For example, Simou et. al. (2010) found that 38% of women in Greece had never undergone a test, while 25% had one within the last 2 years. This lack of engagement with a programme, in terms of identifying breast cancer early, warrants further investigation to explore the influences upon screening behaviour.

Barriers and facilitators to mammography screening use

Previous studies have identified a variety of barriers to women's participation in mammography screening. Poor interactions with physicians and the mammography screening procedure itself (such as painful mammograms and discomfort) were identified through a review on the benefits and harms associated with screening (Meissner et al. 2004), as well as in other studies (Dilhuydy et al. 1997; Nekhlyudov et al. 2003). Anxiety, fear of breast cancer diagnosis (Trigoni et al. 2008), and low-level of risk perceptions and worry (Nekhlyudov et al. 2003) were also found as barriers to participation in mammography screening. Lack of information relating to breast cancer and its early detection (Borgias et al. 1998; Giakimoba et al. 2003), as well as the long distance from the screening centre (Simou et al. 2010) contributed to non- participation in mammography screening.

Other factors, have been identified as facilitators to engaging with the mammography screening test. Broadcast media were viewed as an important source of information regarding the benefits of breast screening on reducing risks from breast cancer, having an important role in motivating women to undergo mammography screening (Nekhlyudov et al. 2003). Others, however, identified personal communication with health care providers and other women to be of greater importance (Clover et al. 1996; McCaul et al. 1999; Trigoni et al. 2008). High socio-economic status was further identified to facilitate women in mammography screening participation (Meissner et al. 2004).

Nevertheless, it was not clear whether the afore-mentioned factors were identified within a national screening program or under private initiative of women. Osterlie et al (2008) and Willis (2008) emphasized that within the context of a public screening program women's decision for mammography screening is not made according to the concept of informed choice. This could place doubt upon the strength of the above barriers and facilitators when women decide to participate in a pre-scheduled appointment for a mammogram provided by a system in which they have trust

(Osterlie et al. 2008; Willis 2008). However, within the Greek context women participate in mammography screening outwith a National screening programme.

Only a few academic studies (Borgias et al. 1998; Giakimoba et al. 2003; Trigoni et al. 2008; Simou et al. 2010) have investigated the factors that influence Greek women to participate in mammography screening. Contrary to the variety of studies carried out in other countries in the same field, the subject has only been superficially explored in Greece.

Theoretical Framework- Transtheoretical Model of behaviour change (TTM)

The study was informed by the Transtheoretical Model of behaviour change (TTM), which is a multilevel, psychologically-based model (Kelaher et al. 1999). The TTM emphasizes that each individual has different needs, since they belong to different behavioural stages of their effort to change or adopt a behaviour (Pasick et al. 2008). Based on its construct of “decisional balance”, the decision to adopt a behaviour depends on the actual number (quantity) of positive and negative factors (pros and cons) (Rakowski et al. 1996; Maxwell et al. 2006; Pasick et al. 2008).

The TTM has been utilized in a variety of studies which aimed to investigate the influential factors towards mammography screening (Pearlman et al. 1997; Chamot et al. 2001; Wu et al. 2007), however, the majority of them were quantitative in nature, focusing on pre-identified factors. This study offered the opportunity to explore the topic using a more in-depth qualitative approach.

The study

Aim

The aim of the study was to explore the factors that influence mammography screening behaviour in Greece in order to better understand women's behaviour and identify their needs in relation to this test. More specifically, the study's objectives were 1) to examine women's perceptions of mammography screening, 2) to explore women's experiences of the mammography screening test, 3) to understand the factors that influence screening behaviour.

Design

The study was conducted in Athens (Greece), using questionnaires and interviews as data collection tools. Prior to the interviews a survey was conducted in order to recruit the sample for the interviews and to provide descriptive information about the sample. For the analysis of the interviews, a qualitative, interpretative approach was adopted.

The TTM was utilized to guide and influence the formation of the interviews. Questions on women's breast screening behaviour stage were used, influenced by the TTM's stages of change. Such questions included the frequency women practice mammography screening, the period of its initiation, and their intention to continue the same behaviour in the future. The pros and cons of the TTM influenced those questions regarding the possible facilitators and barriers to mammography screening behaviour respectively. The TTM stages of change were also used to further understand the characteristics of the different groups of women identified in this study in relation to their mammography screening behaviour.

Participants/Sample

A purposive sample of women was drawn from six Greek women's associations. The sample was intentionally recruited (Creswell et al. 2011) because it was felt that such

groups would give access to a range of women with different backgrounds who might be interested in engaging with such a study, even though such women who participate in organisational life may differ from the general population. Only associations located in Athens were approached, where many breast cancer centres and polyclinics are located. The 120 electronically registered associations in Athens were purposively divided into 4 categories, based on their interests. These were political, educational, professional and cultural, with the latter comprising the majority. A random selection of 3 associations was made, out of each of the above 4 categories (n=12). From these, 6 agreed to participate in the study (3 from the cultural group and 1 from each of the other areas). Associations which focused on health issues, including cancer associations, were excluded in order to avoid a biased sample which may have been more educated about cancer and early detection of breast cancer.

Ethical Considerations

Ethical approval for this study was granted by the Medical School Ethics Committee of the University of Nottingham. Written permission was obtained from the directors of the associations that agreed for their members to be approached by the researcher and to distribute an initial questionnaire. A written consent form was signed by each of the interviewees who took part in the study.

Data collection

Questionnaires were distributed at association meetings, completed in the women's own time and returned to a drop off point. One hundred and eighty six (186) women completed the initial survey, from which 47 were willing to take part in an individual semi-structured interview. Subsequently, 33 interviews were carried out. From the 14 women not interviewed, 8 did not meet the inclusion criteria of the sample, since they were living in district areas of Greece. The remaining 6 had to cancel the interview appointment claiming personal health problems.

After introducing the topic to the interviewees, open-ended questions were used. Open-ended questions focused on three main themes: 1) women's behaviour in relation to mammography screening, 2) the factors that led women to adopt their screening behaviour and 3) women's perceptions and experiences in relation to the mammography screening test. The duration of the interviews ranged from 30 minutes to 1hr and 45 minutes. Interviews were conducted in a comfortable place selected by the participants or within their associations' environment, where only the researcher and the interviewee were present.

Data Analysis

The data analysis was performed by the main author using the constant comparison approach (Glaser et al. 1967; Holloway 2005). This was used to explore the issues that arose in the first interviews (being relayed into the subsequent ones). Comparison between words, sentences, codes, paragraphs and categories was made after all the interviews had been undertaken and transcribed. The NVIVO software (QSR International, Doncaster, Australia) was used for the analysis of the interviews. Tree-nodes were used for the creation of themes and sub-themes. A variety of sub-themes arose during the analysis and associations among them were investigated. Study data from the survey were entered into a Statistical Package for Social Sciences (SPSS) v14.0 file for analysis with descriptive statistics (frequencies and percentages) (Kaltza et al. 2012) used to illustrate the demographic characteristics of the interviewees.

Results

In this paper, the findings revealed from the interviews are presented. Findings from the analysis of the questionnaires have been presented elsewhere (Kaltsa et al. 2012).

Table 1 presents the demographic characteristics of the interviewees. The majority of the interviewees belonged to the age groups 40-49 and 50-59. Most of them were married, having an advanced level of education. Six women out of the total 33 had a history of breast cancer in their family, while one of them had been treated for breast cancer in the past.

A summary of the interviewees' mammography screening behaviour is presented in Figures 1 and 2; these present the behaviour of those who participated or not in the test. Interestingly, one third of those who regularly participated (Figure 1) were doing so after the detection of a (non-malignant) breast lump or experiencing a breast problem. As illustrated in Figure 2, four of those who abstained from the test did not intend to change their behaviour in the future.

A number of key themes emerged from the data analysis, as presented in the following sections. Amongst the main findings was the strong influence women's immediate networks had on breast screening behaviour compared to the low to moderate influence of broader networks. In addition, a variety of obstacles were revealed throughout engagement with the mammography screening process.

Immediate networks

Immediate networks were comprised of women's family, school and close friends. Families appeared to have a strong influence on breast screening behaviour. The majority of regular participants in mammography screening reported that they had already built-up a positive ideology towards early detection and screening from a

young age. Female family members appeared to act as exemplars, which in turn positively influenced breast screening behaviour. The following extracts reported by regular participants in mammography screening illustrate this point:

29: I believe that everything is up to the family's interest to educate their children on such issues. Also, a friendly and creative communication between parents and their children can affect the children's perceptions.

20: My mother and sister do participate in regular mammography screening and this is what positively influenced me towards my breast screening behaviour and regular mammography screening.

Family exemplars, however, were also identified as having a negative influence in participation in mammography screening. Abstainers and non-regular participants reported that they had no education from their family or school on breast cancer and its early detection. In many occasions parents' health taboos and fears had been transferred to their children. This resulted both of them to abstain from mammography screening. The following extract stated by an abstainer from mammography screening offers support to this suggestion:

12: I think that we generally have in our family the same fear towards doctors and such gynaecological cancers' early detection tests. Similar to myself, my two older sisters have never had a mammography screening test. So we act like this as a family, and we believe that cancer will never happen to us, and that we will never develop something bad [cancer]. In my family, we are all thinking this way, and we postpone such examinations all the time.

Women's friends appeared to play an important role, as well. Discussions between female friends comprised an influencing factor towards the creation of a positive ideology for breast screening. The existence of a close, communicative relationship among female friends sensitized them to early detection of breast cancer and provided them with the strength to overcome their fears about cancer. The next extract, reported by a regular participant, supports the above issue.

33: We talk a lot about such issues [cancer and cancer screening], feeling very comfortable. My friends have the same perceptions and screening behaviour as me.

Women's experiences either with cancer or treatment for breast cancer in their family and close friends appeared to play an essential role in shaping their perception of the disease and consequently its early detection. Women felt fear of developing breast cancer especially after experiencing a friend or relative's death from the disease. This led the majority of them to act against a possible scenario of identifying breast cancer at a late stage by having regular breast screening. Some others though hesitated or refused to have screening. The next two quotes reflect on the above contradictory effect, close friends' experiences and associated fear of cancer may have.

20: I was shocked when a friend of mine died from the disease... That incident made me realize the threat of breast cancer, and how dangerous it can be if not detected at an early stage... So, after that I said to myself that "either you like it or not, you are now going to have mammograms on a regular basis" ... It is not necessary to wait until it [cancer] "knocks on my door" in order to start participating in such tests; if I wait until then it will be too late.

31: I have been very sad throughout the particular experience I had because of my sister's breast cancer was a terrible one, which finally destroyed her whole chest. So this is why I don't go for breast screening, including mammograms and clinical

breast examinations, I am afraid. I am not going for such breast examinations and I will never go.

Broader networks

Women's broader social networks however, appeared to be of moderate to low influence, with the exception of trusted personal doctors. Broader networks included women's association, working environment, Breast Cancer campaigns, doctors, and mass media.

Other women's experiences with breast cancer as presented in TV shows positively influenced a substantial number of interviewees to participate in breast screening. The next extract supports this.

20: I have been influenced a lot by women who have told their stories about breast cancer through television programs. These women had been treated for breast cancer and they have survived. I have been positively influenced by their experiences.

However, the effect of the mass media differed among women, since it also depended on women's primary knowledge, education and experiences they had from their immediate networks. For the abstainers from mammography screening test, mass media led to confusion and had created or enhanced fears about cancer and breast screening. The following quote stated by an abstainer explains this issue.

32: There was a cancer campaign advertisement selling t-shirts with a specific symbol on them, which made me feel a lot of fear about breast cancer and made me even stop thinking of taking part in its early detection. The way this advertisement was presented, gave me the impression that one day all women will be threatened. So, it made me even change the television channel in order not to hear about it at all.

On the other hand, the personal relationship women had with their gynaecologist contributed to their knowledge about breast cancer and breast screening. Women who had a trusted and communicative relationship with their personal gynaecologists were more likely to participate to early detection examinations (such as Pap test and mammography screening). The following regular participant emphasizes this issue.

23: I know a lot about this issue [gynaecological cancers]. I read a lot and talk a lot about it with my personal gynaecologist. I am very lucky to have this gynaecologist since I was 20, because we have a very good relationship and communication and she has always treated me very well. I think this helped a lot [regarding her behaviour towards gynaecological cancer and their early detection]. I feel very comfortable with her, since she is an excellent scientist and person as well.

However, lack of doctors' communication skills was identified by a substantial number of participants throughout their engagement with mammography screening. Distrust in doctors was expressed by several breast screening abstainers but also by women who already had a breast problem, such as breast pain, cysts, or non-malignant breast lump. This either discouraged them from breast screening, or made them consult more than one doctor. The next quotes illustrate the above issues.

23: Most doctors are in a hurry and they don't say much while examining you. Many others, especially those who use the mammography screening devices, discourage you to visit them again, since they terrify you by the way they speak about your diagnosis.

17: My experience with doctors is not the best. Doctors say very few things ... only the age at which I should start regular mammography screening. I don't believe that doctors in general are completely honest with their patients. I believe that many of them focus on their financial profits, rather than on patients. This is the main reason

women cannot trust their suggestions completely. This makes me visit more than one doctors so that I make sure about their assessment and suggestions. I don't believe we should fully trust them....

A number of obstacles in relation to women's access to public breast screening centres and oncology hospitals were also identified. Long bureaucratic procedures in the health care system created discomfort and distress. The unpleasant environment in the public sector, due to the high number of people using the service, also distressed women who had to queue for a long time to be screened on the appointment day. All of the above obstacles led a substantial number of women having to resort to the private sector. In many cases they continued participation in breast screening due to the breast problem they already had. The following quotes expressed by participants in mammograms support the above situation and its results respectively.

28: The large number of people, who resort to the public health care sector, makes things very difficult. Also, one of the disadvantages the public health care sector has is that women have to wait for a long time until their appointment for a mammogram and clinical examination. This is due to the fact that you have an appointment months after you book it.

21: I usually don't use the public hospital because it is full of people and I have to wait for a long time in order to have a mammogram and clinical examination. This entire situation is a huge discomfort, thus I usually resort to the private sector.

To summarize, even if influences that arose from broader networks had an impact, in some cases it did not appear to change women's perceptions already created by their immediate social networks. Women who already had built a strong perception of breast cancer and screening from a young age could not easily change their behaviour, regardless of broader networks' influence.

Discussion

The nature of interaction that occurs in women's lives was identified as very influential in relation to subsequent breast screening behaviour; possibly more influential than anticipated. The interaction women had with their immediate social networks, such as family, close friends and school, appeared to have more influence on their screening behaviour, compared to the influence arising from their interaction with their broader networks. Such influences impacted on women's beliefs, perceptions, emotions and thus behaviour in relation to breast cancer and screening in both positive and negative ways, depending on the quality of such interactions.

The strong influence of women's immediate networks on their participation in mammography screening is also evident in previous studies; some of them conducted in Mediterranean countries, with similar cultural characteristics to Greece. For example, Suarez et al. (2000), note that Spanish families tend to help and support family members, placing a higher value on continued involvement in an extended family network (Suarez et al. 2000). Allen et al. (1998) have also pointed out that encouragement to have a mammogram by social network members, such as family members, was positively associated with the intention to have a future mammogram among women who had not yet established a regular pattern of screening. Many studies show that for girls and women at every developmental stage, the need for connection and relationships with others is a primary motivation that determines cognition, affect and behaviour (Gilligan 1982; Surrey 1991; Miller et al. 1997). Close friends also played an important role in the formation of their outlook in relation to breast screening (Zimmerman et al. 1989; Dacey et al. 1999; Husaini et al. 2001; Surbone et al. 2004). Emotional support from close friends helped Greek women overcome personal fears or difficulties in having screening examinations (Suarez et al. 1994).

On the contrary, broader networks which was comprised of mass media, women's associations, job environment, cancer campaigns, doctors and breast screening clinics

appeared not to be of the same importance. This was due to the strong influence immediate networks had, and because the influences that arose from broader networks followed those that arose from the immediate. Women had already created their beliefs, perceptions and emotions in relation to breast cancer and mammography screening before the influences they received from their broader networks could have a major effect. The above factors, however, have been identified as important facilitators and inhibitors elsewhere (Dilhuydy et al. 1997; Nekhlyudov et al. 2003; Meissner et al. 2004). Newspapers, magazines, and television played an important role in motivating most of the participants to undergo a mammography screening, and were viewed as an important source of information regarding the benefits of screening mammograms, and breast cancer risk (Nekhlyudov et al. 2003). On the other hand, obstacles to participation in mammography screening have been related to women's mammography screening experiences (Meissner et al. 2004). Such inhibitors originated from women's complaints of painful mammograms and discomfort (Dilhuydy et al. 1997).

Only interaction with personal doctors appeared to have a strong influence in some occasions in this study. When doctors had built a trusting and communicative relationship with women, their suggestions on mammography screening participation were of essential importance in prompting women to engage to mammography screening (Clarke et al. 2000; O'Malley et al. 2001; Achat et al. 2005).

Interestingly, even though most of the interviewees had an advanced general educational level, this did not appear to influence their perceptions towards screening and thus their participation in mammograms. This contradicts previous studies which support that better educated women are found to be more knowledgeable about their risk of getting breast cancer and thereby participate in breast screening (Borras et al. 1999; Domenighetti et al. 2003; Meissner et al. 2004; Achat et al. 2005).

In Figure 3, a schematic summary of the interactions women had with their social networks and the links between them is shown. Women are centred in the middle of

the concentric circles, which represent (from the inner to the outer) the influences they receive as they grow older, as well as the strength of such influences, from the most to the least influential. The inner circle represents the fundamental influence of immediate social networks, being located closer to women (W). The outer circle, being located away from women (W) represents the moderate to low influences women received later on, which arose from their interaction with their broader social networks.

Quality versus quantity of social interactions and theories/models of health behaviour.

This study reveals the fundamental influence of interactions between women and their social networks and also exposes a different dimension to the way such interactions build women's internal world, and thereby their behaviour. The quality of such interactions was found to create a different level of influence, which thereby has a different effect on breast screening behaviour. Reference to health behaviour theories and models has been helpful to further explain the findings; these include elements of the Theory of Planned Behaviour (TPB) and the TTM.

According to the Theory of Planned Behaviour (TPB), beliefs lead to the formation of a behavioural intention or motivation to engage in a particular behaviour (Pasick et al. 2009). Individual intentions represent a person's motivation (Conner 2002). A woman will therefore more likely express the intention to be screened if she holds favourable views about an action (such as mammography), perceives that her significant others view mammography positively, and perceives herself to have control over obtaining a mammogram (Pasick et al. 2009). The strong influence of significant others to obtain a behaviour/ action was reflected on the positive influence immediate social networks had to Greek women's participation in mammography screening.

However, family members who refused participation in mammograms, discouraged the younger females of the family from attending this test. Women who did not have a communicational and confidential relationship with their family and friends were less likely to have mammograms (Suarez et al. 1994; Tejeda et al. 2009). Breast cancer experiences that arose from some interviewees' immediate networks created the emotion of fear towards breast cancer, which acted either as a motivation or as a barrier to mammography screening. Such a consistent association between high perceived risk of developing breast cancer in the future and experiences arising from women's immediate social networks was also identified in a variety of other research studies (Katapodi et al. 2004; Trigoni et al. 2008; Tejeda et al. 2009). Thus, our findings add further insight to the TPB by emphasizing the different effect significant others may have, depending on the quality of interactions with them.

It is interesting to note that the identified categories of Greek women's breast screening behaviour also appeared to mirror most of the behaviour stages of the Transtheoretical Theory of behaviour change (TTM) (Rakowski et al. 1996; Kelaher et al. 1999; Maxwell et al. 2006). Depending on the quality of influences women had (positive or negative to mammography screening participation) they belonged into different behavioural stages. The connections between the TTM stages and the Greek women's mammography screening behavioural categories/stages are illustrated in Figure 4.

Emphasis should be given at the 'risk for relapse' stage (Figure 4), where women are at risk to stop participation in mammography screening in the future. Despite the various obstacles women reported throughout their engagement with the mammography screening procedure, these had no negative impact on the current regular participants in mammography screening who already had a breast problem. However, this cannot guarantee their future participation. Such obstacles (bureaucratic procedures, long waiting queues to be screened, distrust in doctors, etc), however, may also result in future abstinence of current participants who have not developed any breast problem.

The importance of quality instead of quantity of the interactions with immediate social networks provides a new perspective also on the TTM. Contrary to the TTM, we emphasize the quality of the influential factors, which act as motivators or inhibitors (pros or cons) and range women to the above behaviour stages (Figure 4). This contradicts the findings of some previous studies which emphasized the quantity of women's social networks as an important impact on participation in mammography screening (Cohen et al. 1985; Suarez et al. 1994; Suarez et al. 2000).

In summary, the data presented in this paper add new insight into screening behaviour as well as into relevant models of health behaviour. These tentative insights require further examination and testing. Further research on this issue, could not only advance and enlighten the existing health behaviour models but also constitute the base for the construction of new ones.

Limitations of the study

The purposive selection of women's associations was one of this study's limitations. Such a selection was made to avoid including associations focused on health themes and to increase the variation of the sample's characteristics and thereby screening behaviour. Despite the fact that the findings cannot be generalised to the general female Greek population, due to the qualitative nature of the study and the small number of interviewees, transferability of the findings could be made into future research studies (Tashakkori et al. 1998). A further limitation could be the advanced educational level of the majority of women, which could have influenced their reports regarding their mammography screening behaviour and perceptions of this screening test.

Conclusions

Influences arising from the interviewees' interactions with their social networks appeared to be of essential importance in relation to their mammography screening behaviour. This study provides insight on the direction and level of such influences. The influence arising from women's broader networks ranged from moderate to low, while influences that arose from their immediate networks seemed to be of fundamental importance. It was the quality of interactions between women and their social networks that determined the level and direction of their impact. Depending on the quality of the above interactions, women created particular beliefs, perceptions and emotional responses in relation to breast cancer and screening, which determined their mammography screening behaviour. This provides a new perspective by emphasizing on the quality of the influential factors, which act as motivators or inhibitors (pros or cons).

On an international basis, health care professionals, including doctors and nurses, might be better placed giving more attention to the understanding of women's interpersonal relationships with their immediate networks, and the way these influence beliefs, perceptions and thereby breast screening behaviour. Communication

between doctors and women is something health care professionals could also focus on, in order to provide women useful information, based on their needs. Nurses could get involved in educative practices and the development of health actions, including early detection of breast cancer or they could advance their existing educative role. Such interactions could better and more efficiently inform and educate women about breast cancer and its early detection so that they will be able to make an informed decision on mammography screening participation. An advanced communication between women and health care providers could facilitate in covering women's actual needs on breast screening also among different cultures and health care systems.

The findings of our study could form the basis of future work on investigating the fluctuation of the influence the immediate networks have to current and future breast screening behaviour. They could also comprise a useful database for future research on exploring screening behaviour in other countries, where the type of communication and interaction between women and their social networks may differ and have a different effect on their screening behaviour. Advancement of the current behaviour models and theories could also be the aim of future research, including part of the data revealed in this study.

References

- Achat, H., Close, G., Taylor, R., 2005. Who has regular mammograms? Effects of knowledge, beliefs, socioeconomic status, and health-related factors. *Preventive Medicine* 41(1), 312-20.
- Allen, J. D., Sorensen, G., Stoddard, A. M., Colditz, G., Peterson, K., 1998. Intention to have a mammogram in the future among women who have underused mammography in the past. *Health Educ Behav* 25(4), 474-88.
- Autier, P., Boniol, M., LaVecchia, C., Gavin, A., Hery, C., Heanue, M., 2010. Disparities in breast cancer mortality trends between 30 European countries: retrospective trend analysis of WHO mortality database. *British Medicine Journal* 341(c3620).
- Borgias, G., Konkouras, D., Tzorakoleftheriadis, E., Androulakis, I., 1998. Breast cancer stage 1 in Southwestern Greece: Ten-year results, concerns and prospects. *Journal of Greek Medicine* 73(3), 250 - 253.
- Borras, J. M., Guillen, M., Sanchez, V., Junca, S., 1999. Educational level, voluntary private health insurance and opportunistic cancer screening among women in Catalonia (Spain). *European Journal of Cancer Prevention* 8(5), 427-434.
- Boyle, P., d'Onofrio, A., Maisonneuve, P., Severi, G., Robertson, C., Tubiana, M., Veronesi, U., 2003. Measuring progress against cancer in Europe: has the 15% decline targeted for 2000 come about? *Annals of Oncology* 14(8), 1312-25.
- Chamot, E., Charvet, A. I., Perneger, T. V., 2001. Predicting stages of adoption of mammography screening in a general population. *European Journal of Cancer* 37(15), 1869-77.
- Chamot, E., Perneger, T. V., 2001. Misconceptions about efficacy of mammography screening: a public health dilemma. *Journal of Epidemiology and Community Health* 55(11), 799-803.
- Clarke, V. A., Lovegrove, H., Williams, A., Machperson, M., 2000. Unrealistic optimism and the Health Belief Model. *J Behav Med* 23(4), 367-76.

- Clover, K., Redman, S., Forbes, J., Sanson-Fisher, R., Callaghan, T., 1996. Two sequential randomized trials of community participation to recruit women for mammographic screening. *Preventive Medicine* 25(2), 126-34.
- Cohen, S., Syme, S. L. (1985). *Social Support and Health*. New York, Academic Press.
- Conner, M. (2002). *Health Behaviours*. Leeds, UK, University of Leeds.
- Creswell, J. W., Plano Clark, V. L. (2011). *Designing and Conducting Mixed Methods Research*. London, Sage.
- Dacey, J. A., Sorensen, G., Stoddard, A. M., Peterson, K. E., Colditz, G., 1999. The relationship between social network characteristics and breast cancer screening practices among employed women. *Annals of Behavioral Medicine* 21(3), 193- 200.
- Dilhuydy, M. H., Barreau, B., 1997. The debate over mass mammography: is it beneficial for women? *European Journal of Radiology* 24(2), 86-93.
- Dimitrakaki, C., Boulamatsis, D., Mariolis, A., Kontodimopoulos, N., Niakas, D., Tountas, Y., 2009. Use of cancer screening services in Greece and associated social factors: results from the nation-wide Hellas Health I survey. *European Journal of Cancer Prevention* 18(3), 248-57.
- Domenighetti, G., D'Avanzo, B., Egger, M., Berrino, F., Perneger, T., Mosconi, P., Zwahlen, M., 2003. Women's perception of the benefits of mammography screening population- based survey in four countries. *International Journal of Epidemiology* 32(5), 816- 821.
- Ferlay, J., Autier, P., Boniol, M., Heanue, M., Colombet, M., Boyle, P., 2007. Estimates of the cancer incidence and mortality in Europe in 2006. *Annals of Oncology* 18(3), 581-92.
- Giakimoba, B., Roussos, G., Bombas, A., batalis, K., Abakian, I., Rapti, S., Drakou, A., Athanasiadis, A., Benizelos, M. (2003). Analysis of epidemiological data relating to breast cancer sufferers- Concerns over the implementation of preventive measures. 1st National Conference of Clinical Oncology. Athens, Greece.
- Gilligan, C. (1982). *In a Different Voice: Psychological Theory and Women's Development*. Cambridge, Harvard University Press.

- Glaser, B. G., Strauss, A. L. (1967). *The Discovery of Grounded Theory*. Cicago, IL: Aldine.
- Gotzsche, P. C., 2004. The debate on breast cancer screening with mammography is important. *Journal of the American College of Radiology* 1(1), 8-14.
- Gotzsche, P. C., Hartling, O. J., Nielsen, M., Brodersen, J., Jorgensen, K. J., 2009. Breast screening: the facts or may be not. *British Medicine Journal* 338(b86).
- Gotzsche, P. C., Olsen, O., 2000. Is screening for breast cancer with mammography justifiable? *Lancet* 355(9198), 129-34.
- Heath, I., 2009. Life and Death. It is not wrong to say no. *British Medical Journal* 338, b2529.
- Hoffken, K., 2001. The European experience. *Journal of Clinical Oncology* 19(18 Suppl), 112S-117S.
- Holloway, I. (2005). *Qualitative Research in Health Care*. Berkshire, University Press.
- Husaini, B. A., Sherkat, D. E., Bragg, R., Levine, R., Emerson, J. S., Menten, C. M., Cain, V. A., 2001. Predictors of breast cancer screening in a panel study of African American women. *Women's Health* 34(3), 35-51.
- Ioannidou-Mousaka, L., 2005. Introduction. *Journal of the Hellenic Mastological Society* 1(1).
- Ioannidou-Mousaka, L., 2006. Introduction. *Journal of the Hellenic Mastological Society* 6(1).
- Jorgensen, K. J., Gotzsche, P. C., 2006. Content of invitations for publicly funded screening mammography. *British Medical Journal* 332(538- 541).
- Jorgensen, K. J., Gotzsche, P. C., 2009. Overdiagnosis in publicly organised mammography screening programmes: systematic review of incidence trends. *British Medicine Journal* 339(b2587).
- Jorgensen, K. J., Gotzsche, P. C., 2009. Overdiagnosis in publicly organised mammography screening programmes: systematic review of incidence trends. *British Medical Journal* 339(b2587).

- Jorgensen, K. J., Zahl, P. H., Gotzsche, P. C., 2010. Breast cancer mortality in organised mammography screening in Denmark: comparative study. *British Medicine Journal* 340(c1241).
- Kaltsa, A., Cox, K., Holloway, A., Kalokerinou, A., 2012. Mammography screening in Greece: An exploratory survey of women's views, experiences and behaviours. *International Journal of Caring Sciences* 5(2), 147- 156.
- Kamposioras, K., Mauri, D., Alevizaki, P., Ferentinos, G., Karampoiki, V., Kouiroukidou, P., Zorba, E., Proiskos, A., Chasioti, D., Panou, C., Gkinosati, A., Chatziioannou, I., Aggelinas, G., Xilomenos, A., 2008. Cancer screening in Greece. Guideline awareness and prescription behavior among Hellinic physicians. *European Journal of International Medicine* 19(6), 452-60.
- Katapodi, M. C., Lee, K. A., Facione, N. C., Dodd, M. J., 2004. Predictors of perceived breast cancer risk and the relation between perceived risk and breast cancer screening: a meta-analytic review. *Preventive Medicine* 38(4), 388-402.
- Kelaher, M., Gillespie, A. G., Allotey, P., Manderson, L., Potts, H., Sheldrake, M., Young, M., 1999. The Transtheoretical Model and cervical screening: its application among culturally diverse communities in Queensland, Australia. *Ethnicity and Health* 4(4), 259-76.
- Keramopoulos, A., Louvrou, A., Ampela, K., Vourli, G., Baltas, D., Keramopoulos, D., Gaki, B., Dimitrakakis, K., Bebi, M., Bredakis, N., 2005. Diagnostic approach to women with breast cancer in Greece. *Archives of Hellinic Medicine* 22((1)), 66 - 72.
- Kimberly, A., Hogan, M., 2003. The mammography debate: keeping current. *Patient Care* 6(10), 8.
- Levi, F., Bosetti, C., Lucchini, F., Negri, E., La Vecchia, C., 2005. Monitoring the decrease in breast cancer mortality in Europe. *European Journal of Cancer Prevention* 14(6), 497-502.
- Levi, F., Lucchini, F., Negri, E., La Vecchia, C., 2007. Continuing declines in cancer mortality in the European Union. *Annals of Oncology* 18(3), 593-5.

- Linos, D. (2005). Trying breast cancer without surgery. *Vima*: H02.
- Mauri, D., Valachis, A., Polyzos, N. P., Cortinovis, I., Karampoiki, V., Loukidou, E., Alevizaki, P., Kamposioras, K., Kouris, G., Alexandropoulou, P., Tsali, L., Panou, C., Stamatelopoulos, A., Lakiotis, V., Spiliopoulou, A., Terzoudi, A., Ioakimidou, A., Karathanasi, I., Bristianou, M., Casazza, G., Pavlidis, N., 2009. Screening practice and misplaced priorities. *Clinical and Translational Oncology* 11(4), 228-36.
- Maxwell, J., Onysko, J., Bancej, M., Nichol, M., Rakowski, W., 2006. The distribution and predictive validity of the stages of change for mammography adoption among Canadian women. *Journal of Preventive Medicine* 43(3), 171-177.
- McCaul, K. D., Tulloch, H. E., 1999. Cancer screening decisions. *Journal of the National Cancer Institute Monographs* (25), 52-8.
- Meissner, H. I., Smith, R. A., Rimer, B. K., Wilson, K. M., Rakowski, W., Vernon, S. W., Briss, P. A., 2004. Promoting cancer screening: Learning from experience. *Cancer* 101(5 Suppl), 1107-17.
- Miller, J. B., Stiver, I. P. (1997). *The Healing connection: How Women Form Relationships in Therapy and Life*. Boston, Beacon Press.
- Nekhlyudov, L., Ross-Degnan, D., Fletcher, S. W., 2003. Beliefs and expectations of women under 50 years old regarding screening mammography: a qualitative study. *Journal of General Internal Medicine* 18(3), 182-9.
- O'Malley, M. S., Earp, J. A., Hawley, S. T., Schell, M. J., Mathews, H. F., Mitchell, J., 2001. The Association of Race/Ethnicity, Socioeconomic Status, and Physician Recommendation for Mammography: Who Gets the Message About Breast Cancer Screening? *American Journal of Public Health* 91(1), 49-54.
- Osterlie, W., Solbjør, M., Skolbekken, J. A., 2008. Challenges of informed choice in organised screening. *J Med Ethics* 34(e5).
- Pasick, R. J., Barker, J. C., Otero-Sabogal, R., Burke, N. J., Joseph, G., Guerra, C., 2009. Intention, subjective norms, and cancer screening in the context of relational culture. *Health Education and Behavior* 36(5 Suppl), 91S-110S.

- Pasick, R. J., Burke, N. J., 2008. A critical review of theory in breast cancer screening promotion across cultures. *Annu Rev Public Health* 29, 351-68.
- Pearlman, D. N., Rakowski, W., Clark, M. A., Ehrich, B., Rimer, B. K., Goldstein, M. G., Woolverton, H., 3rd, Dube, C. E., 1997. Why do women's attitudes toward mammography change over time? Implications for physician-patient communication. *Cancer Epidemiology, Biomarkers and Prevention* 6(6), 451-7.
- Rakowski, W., Dube, C., Goldstein, M., 1996. Considerations for extending the Transtheoretical model of behaviour change to screening mammography. *Health Education Research: Theory and Practice* 11(1), 77-96.
- Savage, L., 2009. Invitation or summons? UK debate surrounds messages about mammography. *Journal of the National Cancer Institute* 101(13), 912 - 913.
- Simou, E., Foundoulakis, E., Kourlaba, G., Maniadakis, N., 2010. Factors associated with the use of preventive services by women in Greece. *European Journal of Public Health*, Vol. 21, No. 4, 512–519 21(4), 512-519.
- Smith, R. A., Cokkinides, V., Eyre, H. J., 2004. American Cancer Society guidelines for the early detection of cancer, 2004. *CA: A Cancer Journal for Clinicians* 54(1), 41-52.
- Suarez, L., Lloyd, L., Weiss, N., Rainbolt, T., Pulley, L., 1994. Effect of social networks on cancer-screening behavior of older Mexican-American women. *Journal of National Cancer Institute* 86(10), 775-9.
- Suarez, L., Ramirez, A. G., Villarreal, R., Marti, J., McAlister, A., Talavera, G. A., Trapido, E., Perez-Stable, E. J., 2000. Social networks and cancer screening in four U.S. Hispanic groups. *American Journal of Preventive Medicine* 19(1), 47-52.
- Surbone, A., Ritossa, C., Spagnolo, A. G., 2004. Evolution of truth-telling attitudes and practices in Italy. *Critical Reviews in Oncology/Hematology* 52(3), 165-72.
- Surrey, J. L. (1991). The 'self-in-relation': A theory of women's development. *Women's Growth in Connection: Writings from the Stone Center*. J. V. Jordan, A. G. Kaplan, J. B. Miller, I. P. Striver and J. J. Surrey. New York, Guilford Press: 51-66.

- Tashakkori, A., Teddlie, C. (1998). *Mixed Methodology: Combining Qualitative and Quantitative Approaches*. London, Sage Publications.
- Tejeda, S., Thompson, B., Coronado, G. D., Martin, D. P., 2009. Barriers and facilitators related to mammography use among lower educated Mexican women in the USA. *Social Science and Medicine* 68(5), 832-9.
- Thornton, H., 2001. Screening for breast cancer with mammography. *The Lancet*.
- Trigoni, M., Griffiths, F., Tsiftsis, D., Koumantakis, E., Green, E., Lionis, C., 2008. Mammography screening: views from women and primary care physicians in Crete. *BMC Womens Health* 8, 20.
- Welch, H. G., 2010. Screening mammography- A long run for a short slide? *The New England Journal of Medicine* 363(13), 1276-1278.
- Willis, K., 2008. I come because I am called: Recruitment and participation in mammography screening in Uppsala, Sweden. *Health Care for Women International* 29(2), 135-150.
- Wu, T. Y., West, B. T., 2007. Mammography stage of adoption and decision balance among Asian Indian and Filipino American women. *Cancer Nursing* 30(5), 390-8.
- Zimmerman, R. S., Connor, C., 1989. Health promotion in context: the effects of significant others on health behavior change. *Health Educ Q* 16(1), 57-75.

Table 1: Interviewees' demographic characteristics

	Interviewees n (%) n = 33
Age	
Under 40	2 (6.1)
40-49	12 (36.4)
50-59	12 (36.4)
60-70	6 (18.2)
Over 70	1 (3.0)
Family Status	
Single	6 (18.2)
Married	21 (63.6)
Divorced	2 (6.1)
Widowed	4 (12.1)
Educational Level	
Less than high school	1 (3.0)
High school	6 (18.2)
College	2 (6.1)
University	15 (45.5)
Master-PhD	9 (27.3)
Nationality	
Greek	33 (100.0)
Other	0 (0.0)
Breast Cancer Family History	
Women who have	5 (18.2)
Women who do not have	25 (75.8)
Women who do not know/are not sure	2 (6.1)

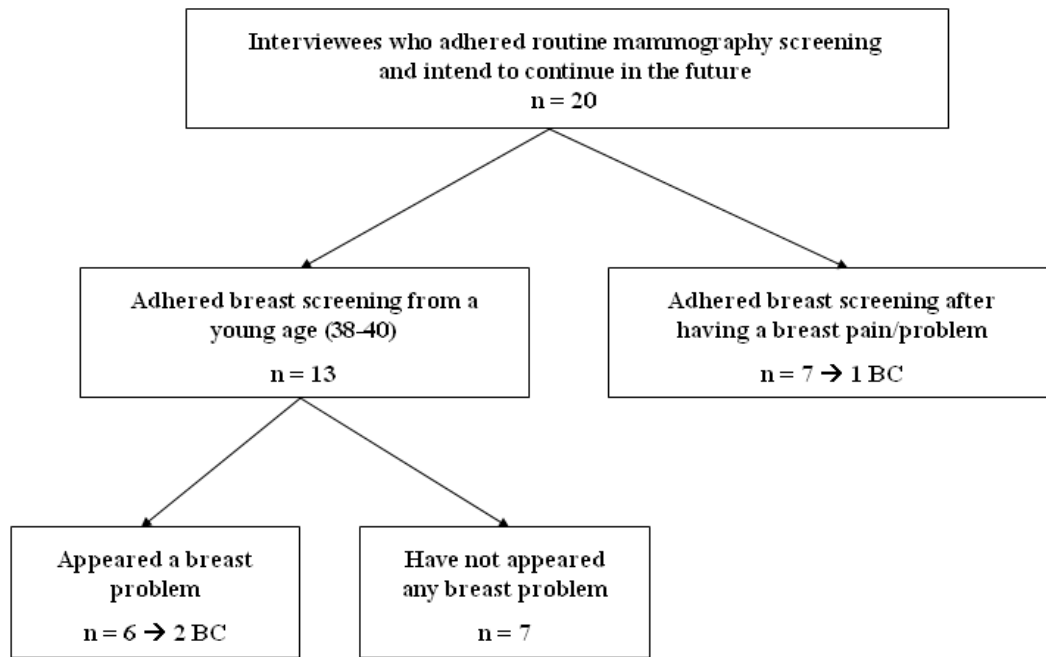


Figure 1: Interviewees’ behavioural characteristics regarding their adherence to regular mammography screening. BC = Breast Cancer

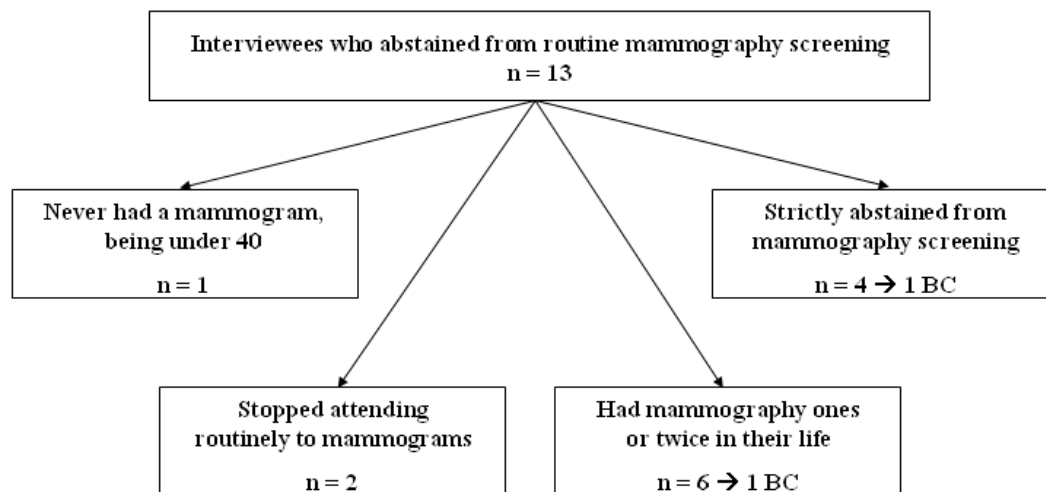


Figure 2: Interviewees’ behavioural characteristics in relation to women’s abstinence from mammography screening. BC = Breast Cancer

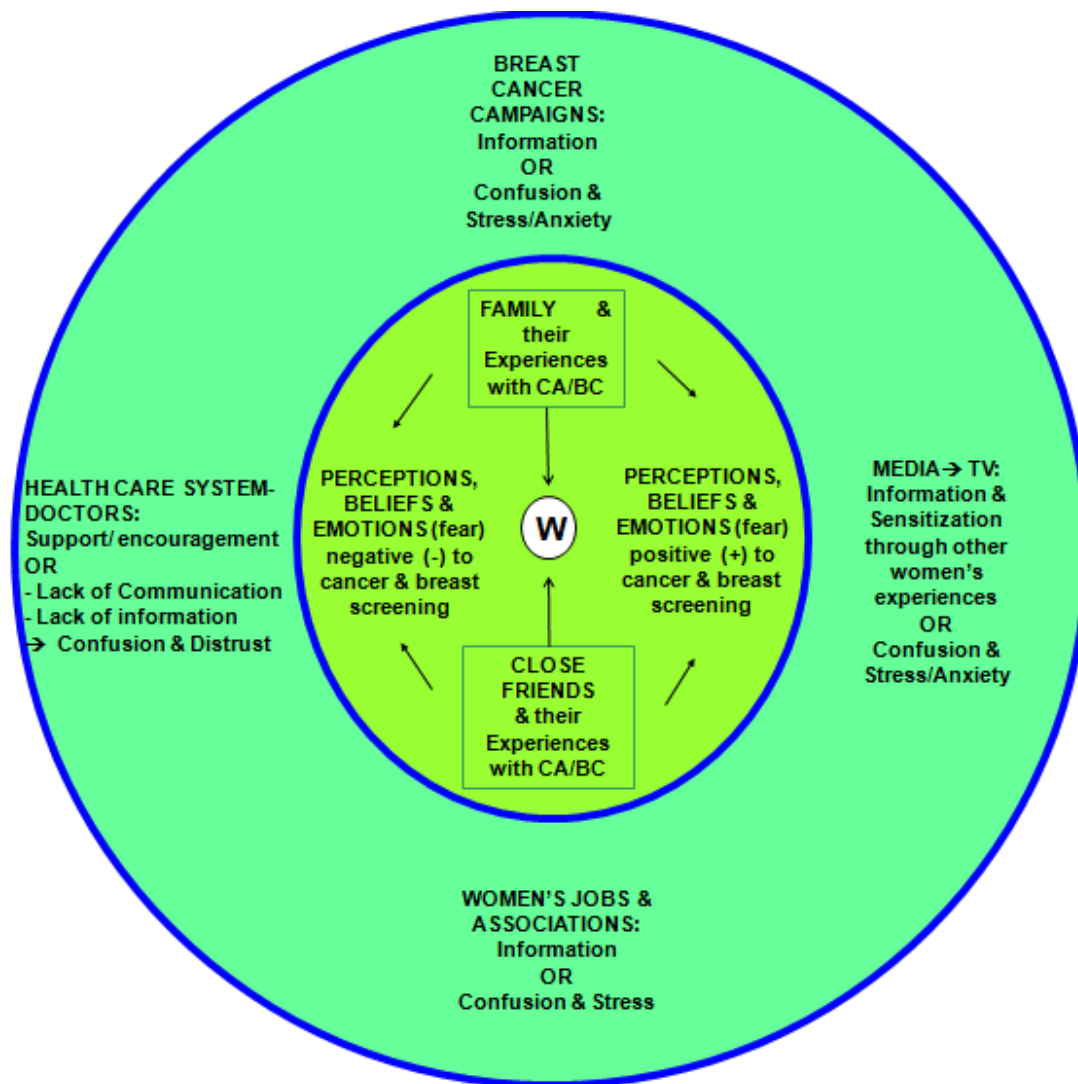


Figure 3: Influences arising from the immediate and broader networks: their strength toward mammography screening behaviour. CA= Cancer, BC= Breast Cancer

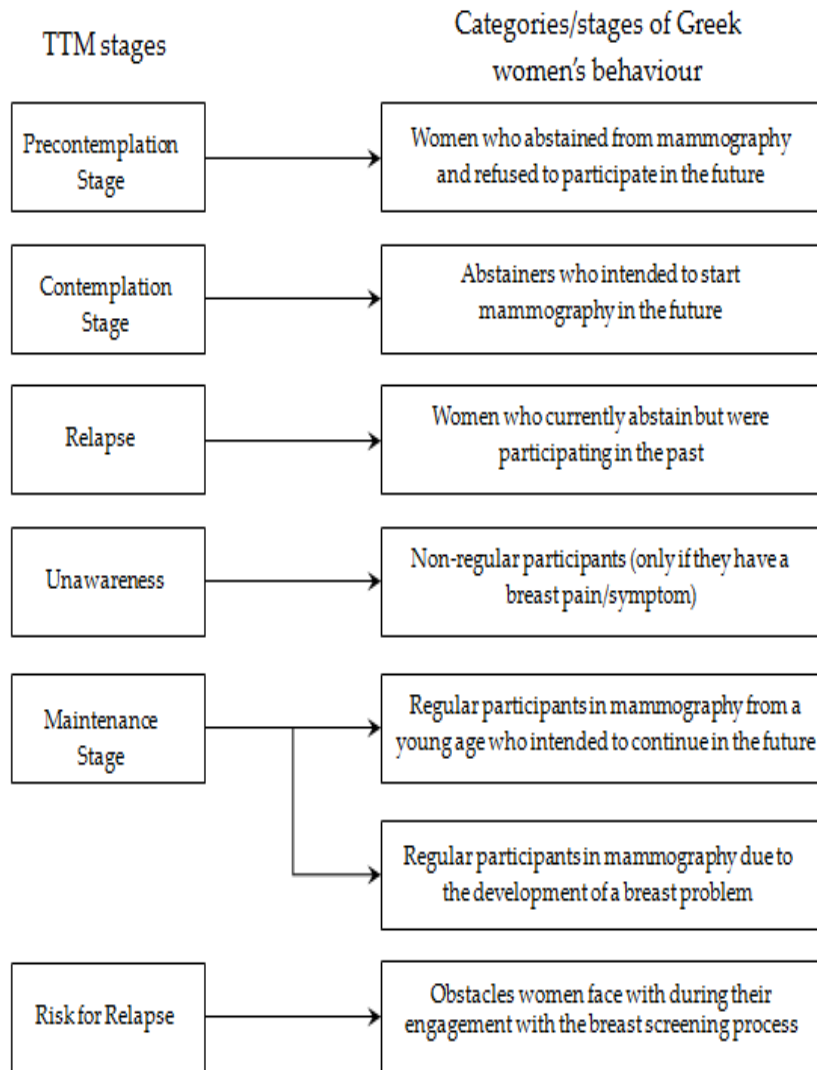


Figure 4: Connections between the Greek women's mammography screening behaviour and the TTM stages. TTM= Transtheoretical Model